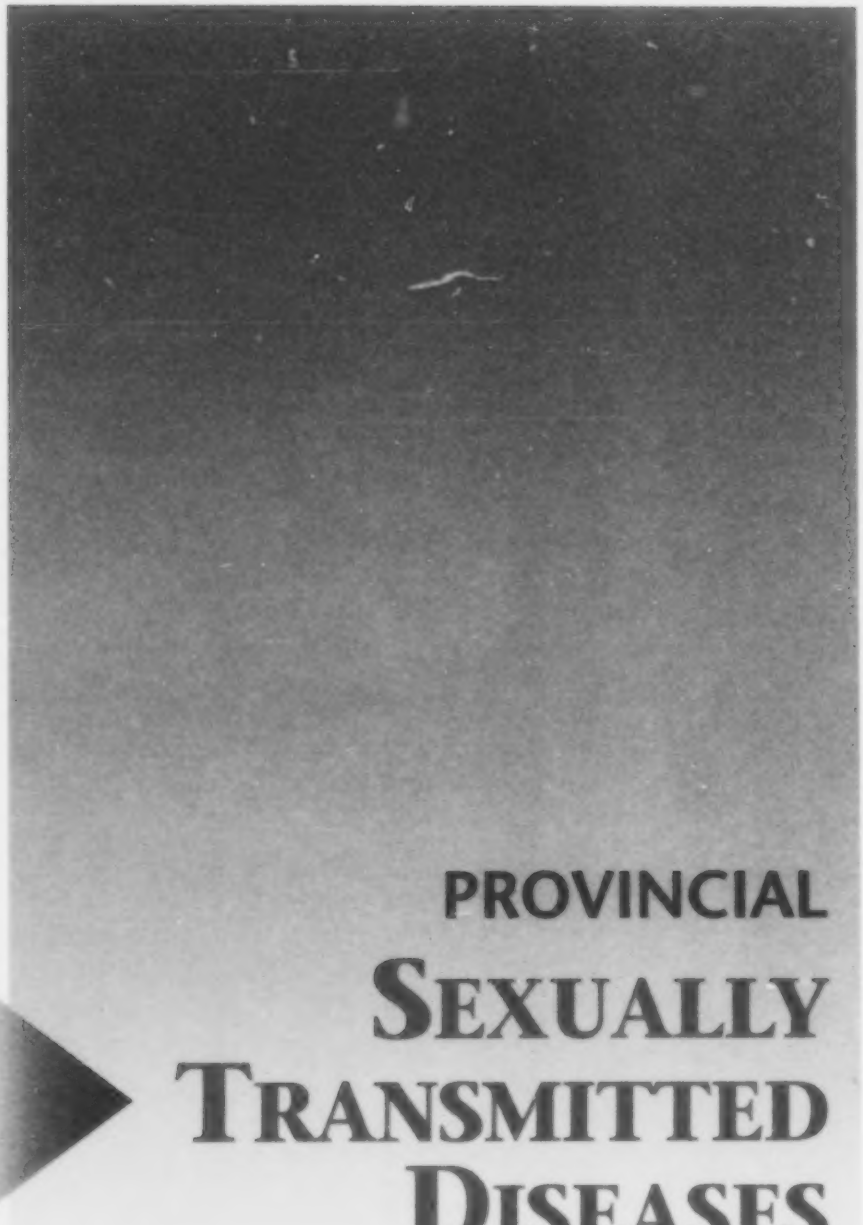

# PROVINCIAL SEXUALLY TRANSMITTED DISEASES CONTROL STRATEGY

August 2001

Communicable Disease Control Unit

Manitoba
Health
Public Health

## ERRATA

**Section 2.6 – Human Immunodeficiency Virus (HIV)**

From 1985 to 1997 there were 649 new cases of HIV infection reported in Manitoba (571 males and 78 females). Of these, 56.2% were in men who reported having sex with men (MSM) and 18.0% were in injection drug users (IDU). A dramatic shift in risk categories occurred over the mid-1990s. In the period from 1998 to 2000, a total of 200 new cases of HIV infection were reported (145 males and 55 females). Of these new cases, 20.5% reported MSM (an almost threefold decline in the proportion from the previous period) and 27.5% reported injection drug use (an increase of roughy 50%). However, the greatest increases in risk category proportions were for heterosexual men and women. Specifically, 9.2% of the incident HIV cases from 1985 to 1997 were among heterosexual males, and an additional 4.6% among heterosexual females. For the 1998-2000 time period, these figures more than doubled: over 20% of newly diagnosed HIV cases were among heterosexual males and an additional 12.5% among heterosexual females (Manitoba Health, 2001).

**Section 3.1 – Gonorrhea**

Figure 2. Age and Sex Proportions of Incident Gonorrhea Infections
15-24 Year Old Females = 35.2%

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# 1 INTRODUCTION

The elimination of gonorrhea and a significant reduction in chlamydial infection are proposed as national goals that Canada should achieve by the year 2010 (Health Canada, 1997). The national incidence of gonorrhea has already declined by 27% and chlamydial infection by 66% since 1991 (Health Canada, 1998a). However, the overall rates are influenced by very high rates in certain vulnerable segments of the population, such as First Nations peoples and young people (Elliott, Blanchard & Mestery, 1998; Health Canada, 1998b). The purpose of a provincial sexually transmitted disease (STD) control strategy is to provide provincial leadership to government, regional health authorities, and community groups in the prevention of the spread of sexually transmitted diseases. By committing to provincial goals and using appropriate strategies to address the needs of vulnerable populations, STD control and prevention programs can reduce the burden of STD morbidity in Manitoba. Additionally, STD control strategies have important implications for HIV prevention.

# 2 SEXUALLY TRANSMITTED DISEASES: RATES AND GOALS

## 2.1 CHLAMYDIAL INFECTION

Chlamydial infection is the most frequently reported communicable disease in North America (Centers for Disease Control, Atlanta, 1996; Health Canada, 1996). While symptoms of infection may include urethral itching, discharge and painful urination for males, and cervical bleeding, pain and discharge for females, the majority of chlamydial infections—25% for males and almost 70% for females—are asymptomatic, and as a result are less likely to be diagnosed and treated (Cates & Wasserheit, 1991; Benenson, 1995). For males, sequelae of infection include infertility, Reiter's syndrome and epididymitis (Benenson, 1995; Berkow & Fletcher, 1992). For females, the health consequences of infection are numerous and considerably more severe than for males. They include infertility, ectopic pregnancy, pelvic inflammatory disease (PID), chronic pelvic pain, and, if women have chlamydial infection during labour and delivery, pneumonic infection of the newborn (Benenson, 1995). Additionally, chlamydial infection increases one's risk of acquiring HIV infection (Dickerson et al., 1996). The financial burden of chlamydial infection and subsequent illnesses in Canada is estimated at over $89 million annually (Goeree & Gully, 1992).

TABLE 1

**Chlamydia Rates per 100,000 by Province, 1998**

| Province | All Males (cases/100,000) | All Females (cases/100,000) | 15-24 year old Females (cases/100,000) | Total (cases/100,000) |
|---|---|---|---|---|
| Newfoundland | 30.3 | 107.7 | 559.8 | 69.3 |
| PEI | 50.4 | 158.1 | 846.4 | 105.1 |
| Nova Scotia | 59.0 | 194.8 | 1140.9 | 128.9 |
| New Brunswick | 66.7 | 210.2 | 1280.8 | 139.1 |
| Québec | 54.9 | 142.0 | 822.0 | 99.2 |
| Ontario | 66.3 | 151.2 | 860.8 | 109.4 |
| **Manitoba** | **153.2** | **394.7** | **2249.6** | **275.0** |
| Saskatchewan | 155.5 | 317.2 | 1722.4 | 236.8 |
| Alberta | 93.7 | 268.2 | 1490.2 | 180.1 |
| British Columbia | 67.4 | 170.3 | 900.6 | 119.3 |
| **CANADA** | **74.4** | **184.6** | **1047.1** | **130.1** |

*(Source: Notifiable Diseases Annual Summary, 1998. Canada Communicable Disease Report, Volume 2655, September 2000).*

*Note: Yukon and NWT not included within table but numbers are reflected in national rates.*

*Note: Rates are crude.*

As can be seen, Manitoba has the highest rate of chlamydial infection among women of all provinces in Canada, and the second highest among men. The extent to which more complete reporting than in other provinces may account for these higher rates is unknown. Health Canada (1997) has proposed that by the year 2010, the national goal for the rate of chlamydial infection should be less than 50 cases per 100,000 population. Applying this 56% reduction rate to Manitoba suggests that we should strive to reduce our overall chlamydial infection rate to 95 cases per 100,000 population. For both Canada and Manitoba, the majority of reported cases are among young women. In Manitoba, 60% of cases of chlamydial infection are accounted for by 15-24 year old females. By the year 2010 Health Canada suggests that the national rate for 15-24 year old women should be less than 200 cases per 100,000 population. This represents a 79% reduction. Applying this reduction rate to Manitoba suggests that by the year 2010, **our chlamydial infection rate for 15-24 year old women should be reduced from 1997.5 per 100,000 to 419.5 cases per 100,000 population**.

## 2.2 GONORRHEA

Since 1980 there has been a steady decline in the number of reported cases of gonorrhea in Canada (Health Canada, 1997). In 1995, the gonorrhea rate was 17.9 per 100,000 people, representing a 12-fold reduction from the 1980 rate (Health Canada, 1997). Gonorrhea shares many of the same clinical features with chlamydia, most importantly, the sequelae of untreated infections. In females, as with chlamydial infection, a large proportion (50%) of infections are asymptomatic (Benenson, 1995). Untreated infection in males may result in chronic urethritis, epididymitis, and gonococcal arthritis. Similar to chlamydial infection, untreated gonococcal infection in females may result in PID, ectopic pregnancy and infertility (Berkow & Fletcher, 1992). Pharyngeal and anorectal infections are also common disease presentations (Benenson, 1995). Among women infected during labour and delivery, conjunctivitis of the newborn can occur (Benenson, 1995). As with chlamydial infection, gonorrhea increases one's risk of acquiring HIV infection (Dickerson et al., 1996). The financial burden of illness attributed to gonococcal infection and associated sequelae in Canada is estimated at over $54 million annually (Goeree & Gully, 1992).

TABLE 2

**Gonorrhea Rates per 100,000 by Province, 1998**

| Province | All Males (cases/100,000) | All Females (cases/100,000) | Total (cases/100,000) |
|---|---|---|---|
| Newfoundland | 0.7 | 0.0 | 0.4 |
| PEI | 1.5 | 0.0 | 0.7 |
| Nova Scotia | 6.3 | 11.5 | 9.0 |
| New Brunswick | 2.1 | 3.4 | 2.8 |
| Québec | 10.2 | 3.0 | 6.7 |
| Ontario | 24.1 | 15.9 | 19.9 |
| **Manitoba** | **51.7** | **56.7** | **54.2** |
| Saskatchewan | 34.5 | 32.0 | 33.3 |
| Alberta | 18.7 | 17.6 | 18.2 |
| British Columbia | 19.5 | 7.6 | 13.5 |
| **CANADA** | **19.9** | **13.5** | **16.7** |

*(Source: Notifiable Diseases Annual Summary, 1998. Canada Communicable Disease Report, Volume 26S5, September 2000).*

*Note: Yukon and NWT not included within table but numbers are reflected in national rates.*

*Note: Rates are crude.*

As can be seen, Manitoba has the highest rates of gonorrhea among women and men of all provinces in Canada. The extent to which more complete reporting than in other provinces may account for these higher rates is unknown. Health Canada (1997), in its proposed national goals document, suggests that, given the low national rate of gonorrhea, it is possible to eliminate locally transmitted gonococcal infection by the year 2010, or reduce the overall rate to less than 5 per 100,000 population. **The suggested goal for Manitoba is total elimination of locally transmitted cases of gonorrhea.**

## 2.3 PELVIC INFLAMMATORY DISEASE AND ECTOPIC PREGNANCY

Pelvic inflammatory disease and ectopic pregnancy are serious sequelae of untreated gonorrheal and chlamydial infections in women.

TABLE 3

**Reported PID and Ectopic Pregnancy Rates per 100,000 by Province, 1995-1996**

| Province | PID Rate | Ectopic Pregnancy Rate |
|---|---|---|
| Newfoundland | 60.8 | 11.5 |
| PEI | 37.9 | 8.5 |
| Nova Scotia | 48.8 | 11.5 |
| New Brunswick | 50.1 | 11.8 |
| Québec | 36.2 | not available |
| Ontario | 46.2 | 13.7 |
| **Manitoba (MH data)** | **94.2** | **12.2** |
| **Manitoba (CIHI data)** | **51.4** | not available |
| Saskatchewan | 92.8 | 15.1 |
| Alberta | 64.8 | 15.2 |
| British Columbia | 52.1 | 16.8 |
| **CANADA** | **49.9** | **14.2** |

*(Health Canada, unpublished data).*

Manitoba again has the highest rate of PID among women of all provinces in Canada when using Manitoba Health data as the comparison. However, it should be noted that the Manitoba Health PID data are obtained from all provincial hospital discharge forms. Both the national rate and the rates for the other provinces were obtained from Health Canada, which uses data supplied by the Canadian Institute for Health Information (CIHI). As individual hospitals each need to purchase data analysis from CIHI, the CIHI data are complete only to the extent that individual hospitals participate. A more meaningful comparison might therefore be to compare the Manitoba PID rates which are found in the CIHI data set with those in the CIHI data set from other provinces. This places Manitoba fifth among the 10 provinces. It is also interesting that Manitoba's ectopic pregnancy rate is sixth of the nine provinces reporting in 1995-1996. As ectopic pregnancy is a life-threatening condition which generally results in hospitalization, it is more likely that the capture of ectopic pregnancies is relatively complete in all provinces. As gonorrhea and chlamydial infection are the most important causes of ectopic pregnancy, Manitoba's lower rates of ectopic pregnancy support the contention that the capture of gonorrhea and chlamydial infection may be higher than in other provinces. This may be the result of more complete reporting, more intensive case-finding, more complete contact tracing or more testing in general.

Health Canada (1997) suggests that the national PID and ectopic pregnancy rates be reduced by 50% by the year 2010. Applying the national goal to the Manitoba numbers suggests that we should aim to **reduce our PID rate to 47.1 cases per 100,000 population and our ectopic rate to 6.1 per 100,000**.

## 2.4 INFECTIOUS SYPHILIS

The incidence of infectious syphilis in Canada has been very low, particularly over the last five years (Health Canada, 1999).

TABLE 4

**Rates of Early Symptomatic Syphilis per 100,000 by Province, 1998**

| Province | All Males (cases/100,000) | All Females (cases/100,000) | Total (cases/100,000) |
|---|---|---|---|
| Newfoundland | 0.0 | 0.0 | 0.0 |
| PEI | 0.0 | 0.0 | 0.0 |
| Nova Scotia | 0.2 | 0.2 | 0.2 |
| New Brunswick | 0.0 | 0.0 | 0.0 |
| Québec | 0.0 | 0.0 | 0.0 |
| Ontario | 0.4 | 0.1 | 0.2 |
| **Manitoba** | **0.4** | **0.0** | **0.2** |
| Saskatchewan | 0.0 | 0.0 | 0.0 |
| Alberta | 0.4 | 0.0 | 0.2 |
| British Columbia | 2.1 | 0.8 | 1.5 |
| **CANADA** | **0.5** | **0.2** | **0.3** |

*(Source: Notifiable Diseases Annual Summary, 1998. Canada Communicable Disease Report, Volume 2655, September 2000).*

*Note: Yukon and NWT not included within table but numbers are reflected in national rates.*

*Note: Rates are crude.*

*Note: Based on number of reported cases—early symptomatic.*

The national goal for the year 2000 was to maintain disease rates for infectious syphilis below 0.5 per 100,000 population (Health Canada, 1997). In Manitoba, from 1992 to 2000 there were 9 cases of primary and 10 cases of secondary syphilis, most of which were imported endemic cases. **An appropriate goal for Manitoba is for the elimination of all endogenously transmitted cases of syphilis, and to maintain near elimination rates of imported endemic cases (less than 0.5 per 100,000)**.

## 2.5 HEPATITIS B

Because the hepatitis B virus (HBV) is transmitted through blood (unlike gonorrhea or chlamydial infections), injection drug users are also at risk of infection. Between 50-70% of all adults infected with acute HBV are either asymptomatic, or their symptoms mimic a variety of flu-like symptoms. As HBV attacks the liver, it is associated with a wide spectrum of liver disease (Berkow & Fletcher, 1992). Between 5-10% of acute HBV infections become chronic and may lead to the development of liver cancer (Berkow & Fletcher, 1992).

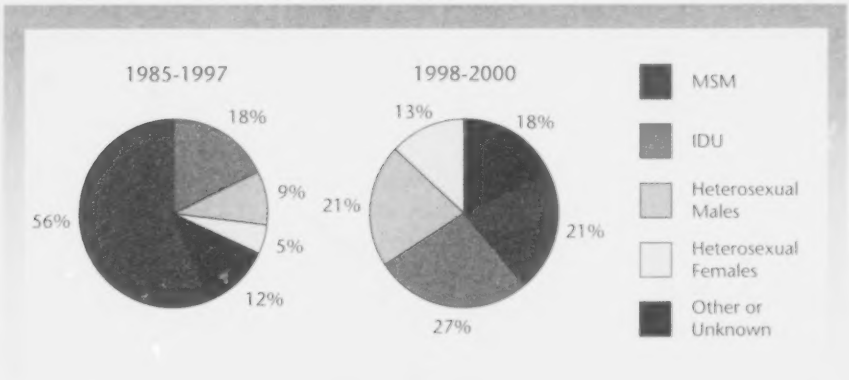
From 1996 to 2000 there were 162 reported cases of acute hepatitis B infections in Manitoba. Of these cases, more than 40% were acquired sexually and an additional 20% were contracted through injection drug use. It is anticipated that the current vaccination program for school-aged children and high-risk individuals (e.g. injection drug users, street youth and people with hepatitis C infection) will reduce HBV transmission significantly. **Therefore, a 50% reduction in acute viral hepatitis B infection by the year 2010 should be a provincial goal.**

## 2.6 HUMAN IMMUNODEFICIENCY VIRUS (HIV)

From 1985 to 1997 there were 645 new cases of HIV infection reported in Manitoba (568 males and 77 females). Of these, 62% were in men who reported having sex with men (MSM) and 18% were in injection drug users (IDU). A dramatic shift in risk categories occurred over the mid-1990s. In the period from 1998 to 2000, a total of 204 new cases of HIV infection were reported (152 males and 52 females). Of these new cases, 23% reported MSM (an almost threefold decline in the proportion from the previous period) and 27% reported injection drug use (an increase of nearly 50%). However, the greatest increases in risk category proportions were for heterosexual men and women. Specifically, 9.2% of the incident HIV cases from 1985 to 1997 were among heterosexual males, and an additional 4.6% among heterosexual females. For the 1997-1999 time period, these figures more than doubled: over 20% of newly diagnosed HIV cases were among heterosexual males and an additional 12% among heterosexual females (Manitoba Health, 2001).

FIGURE 1

**Incident HIV Infection Cases by Risk Category**




*Note: IDU includes MSM/IDU*

In 1996, Manitoba Health published the Provincial AIDS Strategy. This document suggested three broad goals:

- Reduce the spread of HIV infection.
- Provide a continuum of compassionate prevention, care, treatment and support programs for persons at risk of and infected/affected by HIV/AIDS.
- Facilitate the planning, delivery, and evaluation of all programs/efforts to ensure that they are guided by a healthy public policy philosophy.

The implementation of the provincial AIDS Strategy is ongoing. The Strategy identifies populations to which prevention efforts should be directed, including persons infected with and/or exposed to sexually transmitted diseases; men who have sex with men; and injection drug users and their sex partners.

Policies and initiatives directed towards early identification of infections and treatment include the evaluation and re-structuring of the street outreach and needle distribution programs in Winnipeg; the establishment of a process to define and garner support for a provincial harm reduction philosophy; and a review of local data to determine compliance with these policies. It is important that those charged with the provision of direct services be guided by these policies, and that they develop creative and appropriate programs and initiatives to address the needs of their communities.

## 2.7 CONDOM USE

Proper use of a latex barrier in penetrative sexual intercourse and/or oral sexual activity generally blocks the transmission of most sexually transmitted agents (Cates & Stone, 1992; Centers for Disease Control, 1993). While condom use has increased in Canada along with a growing perception of condom use as a socially responsible norm (Health Canada, 1997), there are still large pockets or subsets of Canadians reporting inconsistent use of condoms. For example, the Laboratory Centre for Disease Control (LCDC) in Ottawa reported that less than 25% of young people aged 15-24 years always used a condom in the previous year during sexual intercourse (Health Canada, 1997). Sexually active adolescents present a particular challenge for decreasing, or at least stabilizing the rate of STDs. In order to increase condom use among adolescents, more needs to be learned about factors that encourage or discourage condom use, and, indeed, what is the current rate of condom usage among adolescents in Manitoba. It is therefore proposed that a provincial goal regarding condom usage should be to **develop a framework for surveillance of condom use among adolescents and other high-risk populations**. An ongoing surveillance program for STDs among street-involved youth in Winnipeg will assist in this regard.

## 2.8 SCREENING AND TESTING

Given that early diagnosis of sexually transmitted diseases, in particular chlamydial infection (since it may be asymptomatic), is crucial for timely treatment and partner notification, efforts should be made to increase the numbers of persons, especially those in the 15-24 age group, who are screened. In this age group currently, only about one-quarter of females and less than 5% of males are screened for chlamydial infection each year. **By the year 2005, it is proposed that the provincial goal be to screen 50% of sexually active females and 25% of sexually active males in the 15-24 year age range for chlamydial infection. By the year 2010, the proportion of sexually active 15-24 year olds who are screened for chlamydial infection should be 75% and 50% for females and males, respectively**. To accomplish this goal, urine-based testing will need to be available to all in this high-risk group. Manitoba Health is now working towards making this available.

# 3 SEXUALLY TRANSMITTED DISEASES AMONG ADOLESCENTS

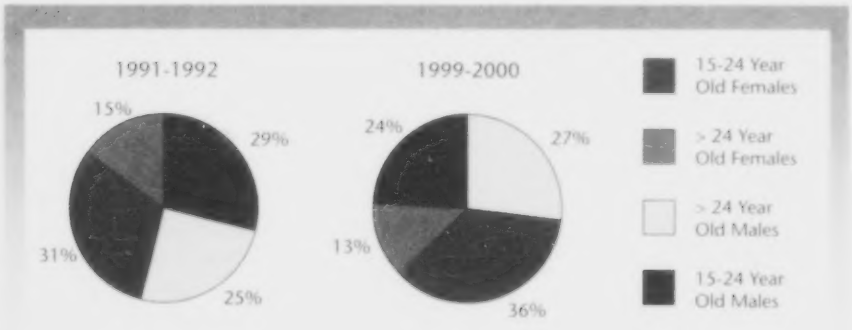
The work of Maticka-Tyndale (1991) and MacDonald et al. (1990) suggests that, among 15-24 year olds, the usual pattern for sexual relationships is one of serial monogamy. Being in a monogamous relationship has also been identified as an impediment to condom use. "The result is that young men and women move from one monogamous relationship to another, justifying their inconsistent condom use since each new partner is known and trusted" (Health Canada, 1997, p.10). The importance of encouraging young people to either abstain from sexual activity or to always use a latex barrier during penetrative sexual activity becomes particularly evident when considering provincial statistics for gonorrhea and chlamydia.

## 3.1 GONORRHEA

For the time period 1991 to 1992, 60% of incident gonorrhea cases in Manitoba were among young people between 15 and 24 years of age. The proportion of new gonorrhea infections from 1999 to 2000 accounted for by 15-24 year olds was similar. The proportion of newly infected females was 46% of all incident cases in 1991-1992 and 49% in 1999-2000 (see Figure 2).

FIGURE 2

**Age and Sex Proportions of Incident Gonorrhea Infections**

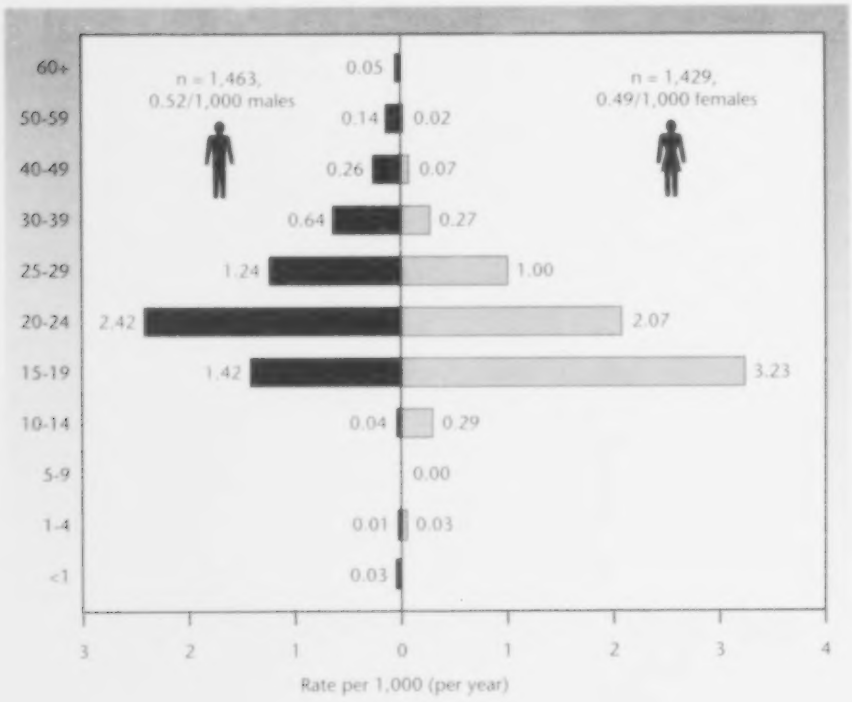



Population rates for chlamydia and gonorrhea are reported below for the time period 1996 to 2000. During these five years the gonorrhea rate (see Figure 3) was 0.5 per 1,000 individuals (0.52 per 1,000 males and 0.49 per 1,000 females). Not only are these rates considerably higher than the national rate for

1995 (0.179 cases per 1,000 individuals; Health Canada, 1997), but the provincial gonorrhea infection rate for the years 1996-2000 for 15-24 year olds was 1.9 per 1,000 males and 2.7 per 1,000 females. Health Canada has proposed that elimination of endemic cases of gonorrhea is achievable by the year 2010 (Health Canada, 1997). If this goal is to be realized, the age and gender discrepancies in gonorrhea infection rates must be addressed.

FIGURE 3

**Rate of Gonorrhea in Manitoba, 1996-2000**

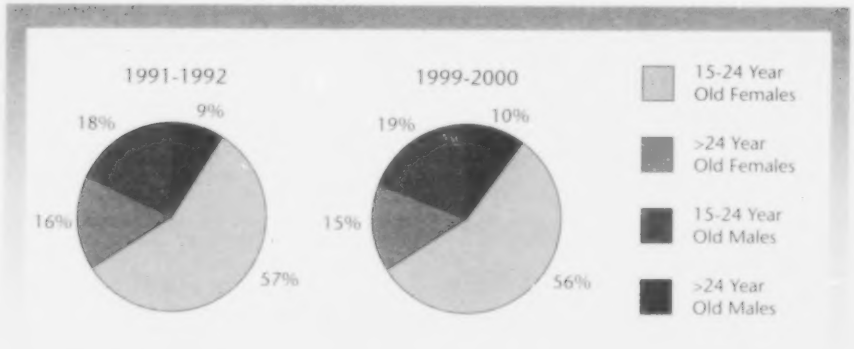



## 3.2 CHLAMYDIAL INFECTION

For chlamydial infection, while the number of incident cases dropped by 28% between the time periods 1991-1992 and 1999-2000, the proportion of cases accounted for by 15-24 year olds remained the same (75%), and this is true for both sexes (see Figure 4).

FIGURE 4

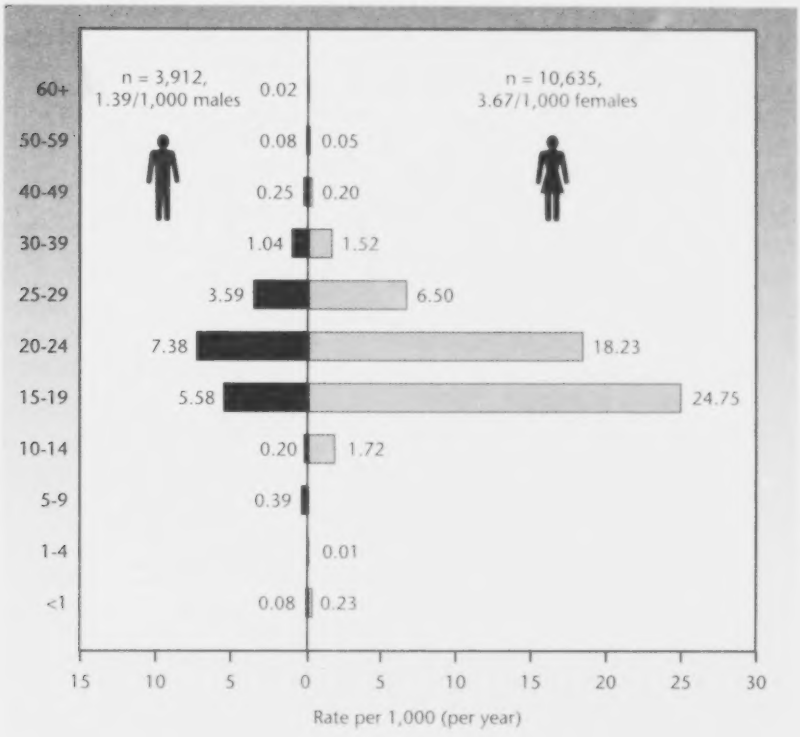
**Age and Sex Proportions of Incident Chlamydial Infections**




The age and gender difference seen for gonorrhea is even more apparent with chlamydial infections. While the provincial chlamydial infection rate from 1996 to 2000 was 2.5 per 1,000 individuals (1.4 per 1,000 males and 3.7 per 1,000 females), the rate for 15-24 year olds was 6.5 per 1,000 males and 21.5 per 1,000 females (see Figure 5). Health Canada has indicated that a national rate of 0.5 per 1,000 individuals and 2 per 1,000 15-24 year old females is achievable by the year 2010.

FIGURE 5

**Rate of Chlamydial Infection in Manitoba, 1996-2000**



# 4 SEXUALLY TRANSMITTED DISEASES IN A PUBLIC HEALTH MODEL

As a public health issue, the control of STDs should be conceptualized within a public health framework. A public health construct means that population health efforts should be:

- *prevention focused* – the primary goal of a public health model is to use interventions that promote health and prevent disease (Kaufman, 1990);
- *population based* – public health campaigns must be focused on affected communities and target groups as well as on infected individuals (Kaufman, 1990);
- *evidence driven* – policy makers must use the findings from quantitative and qualitative research studies to fully understand the size and nature of the population at risk (Health Canada, 1994);
- *multidisciplinary* – to adequately address multiple determinants, an effective strategy should utilize the resources of a variety of disciplines such that multiple opportunities for intervention will be realized (Health Canada, 1994; Kaufman, 1990); and
- *strategic* – public health plans should be action-oriented, with specific and reasonable goals. Such plans should understand the phase of each disease and act accordingly. Congruent with understanding the risk and protective factors, the complex relationships between the determinants and their outcomes should drive prevention/intervention strategies (Wasserheit & Aral, 1996).

What becomes apparent from this public health model is that to control the spread of STDs we first need to have a clear understanding of (a) which populations are at greatest risk; (b) what behaviours and/or circumstances put these populations at risk; (c) what are the best methods to control the spread of STDs within specific populations; and (d) how prevention efforts may impact on the epidemiology of STDs. Only when these issues are understood can a strategy be developed that is multidisciplinary and strategic.

## 4.1 CORE GROUPS

STD core groups are small subsets of the population with high rates of STDs. Without these core groups, the transmission of STDs will not be sustained (Wasserheit & Aral, 1996). Core groups include young, transient individuals living in urban areas with high rates of sex partner change and drug use. A high rate of sex partner change is a key behavioural factor in maintaining high STD rates (Brunham, 1997). The rate of partner change is not the same as the average number of sexual partners at a given time. Some individuals have regular

concurrent partnerships, and they may be more important in maintaining STD transmission than individuals who have serial multiple partners, partly because of low levels of condom usage with regular partners (Brunham, 1997; Elliott et al., 1998). If prevention efforts are to be successful then, research must focus on (a) the identification of these groups, and (b) the social and sexual dynamics of identified core groups.

Understanding how segmented a core group is from the rest of the population also has implications for a public health response. For example, if a core group is highly segmented from the population and can be identified geographically, then group-specific screening measures may be more appropriate than aggressive contact tracing (Blanchard et al., 1998). In Manitoba, individuals with high STD rates tend to cluster in two main geographies—the northern rural section of the province and the downtown core area of Winnipeg. Given that access to preventive and intervention services is crucial to the control of STDs, geographic disparities demand investigation. Compared to the province as a whole, both the northern rural section of the province and the core area of Winnipeg are characterized by:

- high unemployment and poverty rates
- disproportionate population of young people, i.e., less than 25 years old
- disproportionate population of First Nations people
- disproportionate number of single-parent families
- racial, ethnic and cultural diversity
- language barriers
- high migration

In addition, the core area of Winnipeg in particular seems to be the focal point for a variety of social and sexual networks, with sub-communities of injection drug users and sex trade workers. In addition to its residents, this area is accessed by many different groups from a variety of geographic locations. It is important to recognize that many of the socio-demographic characteristics of these two geographic core groups are not negative, but suggest the need for prevention and intervention programs that work in harmony with the cultural, spiritual, linguistic and social needs of a diverse community.

## 4.2 RISK FACTORS

In addressing the risk factors involved in the acquisition and spread of STDs, there is increasing evidence that a broad health determinants model has much explanatory value. The health determinants model suggests that a multifactorial approach which considers genetic, behavioural, environmental, psychological, and medical factors as contributors to disease spread will allow for a more comprehensive and inclusive understanding of appropriate prevention and intervention models (Health Canada, 1994). Some of the behavioural risk factors suggested in the spread of STDs include:

- early age of first intercourse
- having multiple sex partners
- non-use of condoms during sexual encounters
- men having sex with men
- sharing of injection drug equipment
- the use of shooting galleries
- the use of cocaine

Additionally, as previously noted, being in a self-perceived monogamous relationship has been identified as an impediment to condom use. Using a provincial STD surveillance database to identify individuals who had acquired gonorrhea, chlamydia or syphilis in a 12-month period, Elliott et al. (1998) examined self-reported reasons for engaging in unprotected sexual activity. The authors found that while 37% of the 15-19 year old respondents used a condom during their last vaginal intercourse with a non-regular partner (non-regular was defined as a relationship lasting less than 12 months), only 25% used a condom with their regular sex partner. Furthermore, 75% of the respondents stated that one of the reasons that they did not regularly use a condom was because they were in a mutually exclusive relationship, suggesting the possibility that they may have acquired their STD from their regular sex partner.

For injection drug users, the use of cocaine presents a particular problem because of the tendency for more injections per day and more binges. The more one injects the greater the likelihood of using a dirty needle. Similarly, injecting with others, for example in a shooting gallery, increases the risk of using someone else's used equipment. The contribution of sharing injection drug use equipment to STD rates, in particular HIV and HBV, cannot be overstated. Results from the Winnipeg Injection Drug Epidemiology (WIDE) study indicate that more than 40% of IDUs have sexual partners who are not IDUs, and 60-70% of IDUs do not use condoms with their regular sex partner, thus substantially increasing the risk of STD infection to non-IDUs (Elliott et al., 1999).

Other markers which have been suggested as increasing one's risk of acquiring an STD include:

- lack of accessible and culturally appropriate health services
- lack of anonymity in obtaining condoms and/or clean needles
- transience
- homelessness
- poverty
- having less than a high school education
- prostitution
- a genetic susceptibility to addiction
- poor impulse control
- history of childhood abuse
- early childhood low socio-economic status
- marginalization of injection drug users and prostitutes
- unstable housing

# 5 PREVENTION EFFORTS

Prevention efforts may be at the primary, secondary or tertiary levels. The primary level focuses on prevention of infection through behavioural interventions, harm reduction and programs addressing the determinants of health. Prevention at the secondary level is consistent with early detection and treatment efforts. Tertiary prevention can be defined as early access to effective and comprehensive health care and social support. Prevention at this level also includes prevention of the consequences of infection.

## 5.1 PRIMARY PREVENTION

Traditionally, prevention of sexually transmitted diseases has been equated with abstinence from engaging in risky behaviours. There is a growing realization however that for many individuals and communities, abstinence is not an attainable goal. In contrast, a harm reduction model accepts the reality that many behaviours are too strongly motivated and habituated to be readily changed. Harm reduction sets as its primary goal a decreased risk of infection. This model includes abstinence not as an end, but rather as one of several means to lowering one's risk. Manitoba Health is currently in the process of developing a provincial policy on harm reduction.

Because of the risk factors involved in STD transmission, those having unprotected sexual contact and injection drug users are at greatest risk of infection and transmission. Additionally, as previously noted, young people have the highest reported rates of bacterial STDs in Canada (Macdonald et. al., 1990). HIV infection is showing its most rapid increase among heterosexuals (who are not injecting drugs), with an alarming increase in young people, especially 15-19 year old females. These figures highlight the need for public policy to (a) encourage harm reductive activities at a population-based level, and (b) design programs that target high-risk groups.

Motivating individuals to be more discriminating in their behavioural choices requires the efforts of parents, teachers, youth care workers, medical professionals, outreach personnel and peers. At the behavioural level, knowledge and awareness is clearly not enough to ensure change. In addition to the efforts of individuals, facilitating behaviour change is also the responsibility of community groups and government policymakers, which have much impact on the choices available to people. Some of the ways that government can work toward minimizing the risks engaged in by individuals include:

- conducting studies to identify the environmental and personal barriers to change, and subsequently developing strategies to address them;
- engaging peer leaders in strategic planning models;
- developing and evaluating culture and age-appropriate programs;

- identifying specific objectives for which the community can strive; and
- ensuring that community groups have the resources they need to accomplish provincially mandated goals.

Intervention at the community level is crucial, as community leaders are the most qualified to assess and address the needs and concerns of constituents. It is imperative that provincial goals be relevant for targeted populations. Communities must accept STD control strategies as important for them. To this end, government must liaise with community leaders to ensure that the strategies developed reach the people at the front lines. Programs must be developed at the community level that work with, not in lieu of, community values and norms.

### 5.1.1 Sexual Activity

Some of the primary prevention strategies that have been used at the community level to reduce individuals' risk of STD/HIV infection and/or transmission through increased condom use include:

- culture and age appropriate education targeted at high-risk groups
- individual and group behavioural interventions
- peer education initiated through community mobilization
- school-based education services
- community-based outreach
- availability of sexual health promotion materials in remote and/or small communities
- provincially arranged sexual health phone lines and Web sites

### 5.1.2 Injection Drug Users

One of the barriers to harm reduction among IDUs in Manitoba is their current drug of choice—cocaine. Since cocaine injection by itself is a risk factor, the treatment of cocaine use is an issue that requires attention. Improved treatment options should be explored. Criminal justice approaches that focus on prosecution of users tend to marginalize IDUs, and are another barrier to harm reduction. This is also true for the prosecution of prostitutes. Services conducive to risk reduction, such as needle exchange, condom distribution and educational support, should be concentrated in areas common to core groups, and must be accessible to them. Some specific primary prevention efforts for IDUs include:

- needle distribution and exchange
- safe disposal sites for used injection equipment
- safe injection sites
- police efforts that focus on dealers not on personal users
- pharmacies helping with needle exchanges and sales
- public media campaigns

### 5.1.3 School-Based Prevention

As many sexual decisions are made and norms are set during adolescence, schools are a particularly appropriate setting for prevention campaigns. Some characteristics of effective school-based programs include (Jemmott et al., 1999):

- use of peer helpers and educators
- age-appropriate information
- clear content of the message
- ensuring that the audience understands all the risks
- addressing social and media influences
- teaching interpersonal skills that have been geared toward harm reduction
- allocation of sufficient classroom time per school year

Adolescents are a difficult population to reach as many feel that they are invulnerable. A multidisciplinary approach to prevention is mandatory in this population.

### 5.1.4 Intervention in Prisons

Intervention in prison and youth detention settings poses a particular challenge, as often the facility's mandate is security, not harm reduction. Providing clean needles to inmates may be viewed as a security risk, as opposed to a harm reduction method. Working with prison officials on ways to prevent spreading disease without compromising security should be a priority. The costs of long-term health care associated with chronic diseases such as hepatitis C, and the risk of disease spread by those who are set to rejoin the community at some time in the future, should motivate increased work with this population. Enhanced STD screening, surveillance and treatment in detention facilities can be effective disease control efforts that should not challenge security efforts.

### 5.1.5 Research

Notwithstanding the importance of behavioural, community and political influences, the medical community can make important contributions to the STD control process. Some examples include the development of:

- highly sensitive diagnostic tests for gonorrhea and chlamydia (e.g., urine-based amplified testing technology);
- hepatitis B vaccination; and
- highly effective, single dose therapies for gonorrhea and chlamydia.

Additionally, current research programs focussing on cocaine substitution therapy, an HIV vaccine and continually improving STD/HIV therapies hold much promise.

## 5.2 SECONDARY PREVENTION

Both bacterial and viral STDs increase the risk of HIV transmission and acquisition (Dickerson et al., 1996; Hook et al., 1992; Telzak et al., 1993; Wasserheit, 1994). Early detection and treatment of STDs are therefore not only important in their own right, but as an important HIV prevention strategy.

### 5.2.1 Screening Programs

Results from the Winnipeg Injection Drug Epidemiology (WIDE) study show that almost all of the injection drug users sampled (98.2%) were in contact with the health profession in the year prior to being interviewed, and the majority on a monthly basis (55.4%). Many of the participants encountered the health care system through walk-in clinics or emergency room visits (Elliott et al., 1999). The high frequency of contact with the health care system raises the question of missed opportunities for education, counselling, and STD testing as a secondary prevention measure.

Examinations of the efficacy of core group screening programs have been positive and support their effectiveness (Cohen et al., 1997). Developing a comprehensive STD/HIV screening program is a challenging task which requires addressing several issues. One such issue is ensuring standardized training for those giving pre- and post-test counselling and conducting education sessions. Standardized training does not preclude community or core group-specific activities. Another issue is increased accessibility to testing. In conjunction with increased accessibility to testing, information providers, such as public health nurses, should be able to order the appropriate tests. This is a real stumbling block in rural areas where physicians may only service communities on a rotating basis.

The feasibility of other testing models should also be considered. For example, testing for chlamydial infection and gonorrhea currently requires a cervical swab for women and a urethral swab for men. However, nucleic amplification testing, with approximately 95% sensitivity, has excellent performance for both infections (Health Canada, 1997). Widespread use of urine testing could greatly decrease the discomfort, both psychological and physical, of being tested for both women and men, and increase access to testing. However the material and labour costs of such testing is significantly higher than current methods.

Anonymous HIV testing is another testing modality which should be considered. In rural communities in particular, lack of anonymity can be a real barrier to testing for and thus detecting and treating STDs. Stigmatization surrounding testing, particularly for HIV, is another barrier to testing, relevant for both rural and urban communities. One solution is to normalize HIV testing. For example HIV testing is increasingly becoming part of routine prenatal testing; insurance companies could be legally discouraged from discriminating against those who go for testing; public health nurses could be invited to offer STD/HIV testing as part of the school sex education curriculum. Additional barriers to testing must be identified and addressed as they apply to specific groups and communities. Rapid tests for HIV screening have recently been licensed in Canada, and their use in reaching high-risk groups should be explored. Manitoba Health is currently reviewing provincial policy on HIV testing and reporting, including the use of rapid tests.

### 5.2.2 Contact Tracing

Contact tracing for STDs is an important mechanism for identifying and treating new cases. For example, in excess of 50% of male and female partners of people with chlamydial infection are themselves infected (Health Canada, 1997). If not contacted, screened and treated, re-infection of the treated partner can also occur. If done by trained health care workers, contact tracing has the potential to decrease the rate of re-infection, control the occurrence of antibiotic-resistant strains and encourage more timely treatment (Parent & Alary, 1996). Most importantly, contact tracing can help to identify core groups of infected individuals in the community. While the number of sexual partners is a good indicator of the probability of contact between infected and susceptible people, neither sexual couplings nor STDs are randomly distributed among the population. Sexual networks not only exist, but are to a great extent mutually exclusive (Blanchard et al., 1998). Targeting the number of sexual partners as a mechanism for reducing the rate of STDs requires identification of specific groups with high rates (Maticka-Tyndale, 1997). Contact tracing is one way to accomplish this.

### 5.2.3 Surveillance

Surveillance is a critical aspect of disease prevention. Without knowledge of trends in rates of infection among different groups, policymakers have no way of knowing what are the important risk and protective factors, what issues are particularly relevant for specific groups, where services are required, and which prevention or intervention measures are most effective. In short, one cannot effectively implement prevention or intervention programs without good surveillance. Surveillance requires two things—committed resources and mandatory reporting. It should be noted, however, that if access to effective screening methods are enhanced then surveillance may show increases initially in STD/HIV rates.

## 5.3 TERTIARY PREVENTION

As defined earlier, tertiary prevention implies access to effective and comprehensive health care and social support, and prevention of the consequences of infection. The Canadian goal for the year 2000 was to increase access to and use of diagnostic and treatment facilities for STDs (Health Canada, 1997). The extent to which this has occurred is unclear.

### 5.3.1 Access to Treatment

Improved access to STD treatment is an important provincial goal, especially for those in rural areas. Some of the barriers to accessing effective and timely treatment and support are:

- concerns regarding treatment competence by physicians
- concern about stigmatization
- lack of co-ordination and information sharing between service providers and the community
- lack of treatment support programs

- lack of resources and physician services outside of Winnipeg
- lack of adequately funded programs
- lack of appropriate time to implement programs

Some medical and political factors that have the potential to strongly and positively contribute to effective and timely treatment and support include:

- consultation with infected and affected people regarding service delivery
- addressing the needs of First Nations communities with regard to services for prevention, detection and intervention
- dissemination of information outside of Winnipeg
- integration of comprehensive community-based services
- changing the context of public education
- changing the stigma surrounding needle exchange/condom distribution
- one-stop shopping for harm reduction services
- addressing conflicting policies, e.g., prisons and needle distribution
- improving the method of mentorship for primary care physicians, nurses, etc.
- working with, not against community groups and/or leaders

### 5.3.2 Adherence to Treatment

For HIV infection in particular, numerous pills and injections, timing of medication, many and largely unknown side effects and drug interactions, and the need for a lifetime commitment all influence the ability to adhere to treatment regimens. Assuming effective therapies, treatment efficacy ultimately relies on the ability of the infected individual to maintain a treatment regimen. Treatment-adherence is not one particular action, but rather represents a collection of behaviours that are as strongly influenced by medical and political forces as they are by individual factors. Some of the factors found to encourage greater adherence to treatment regimens include:

- high self-efficacy
- belief in the medications
- supportive environments
- fewer medication doses per day
- ability to take the medication away from home
- community support

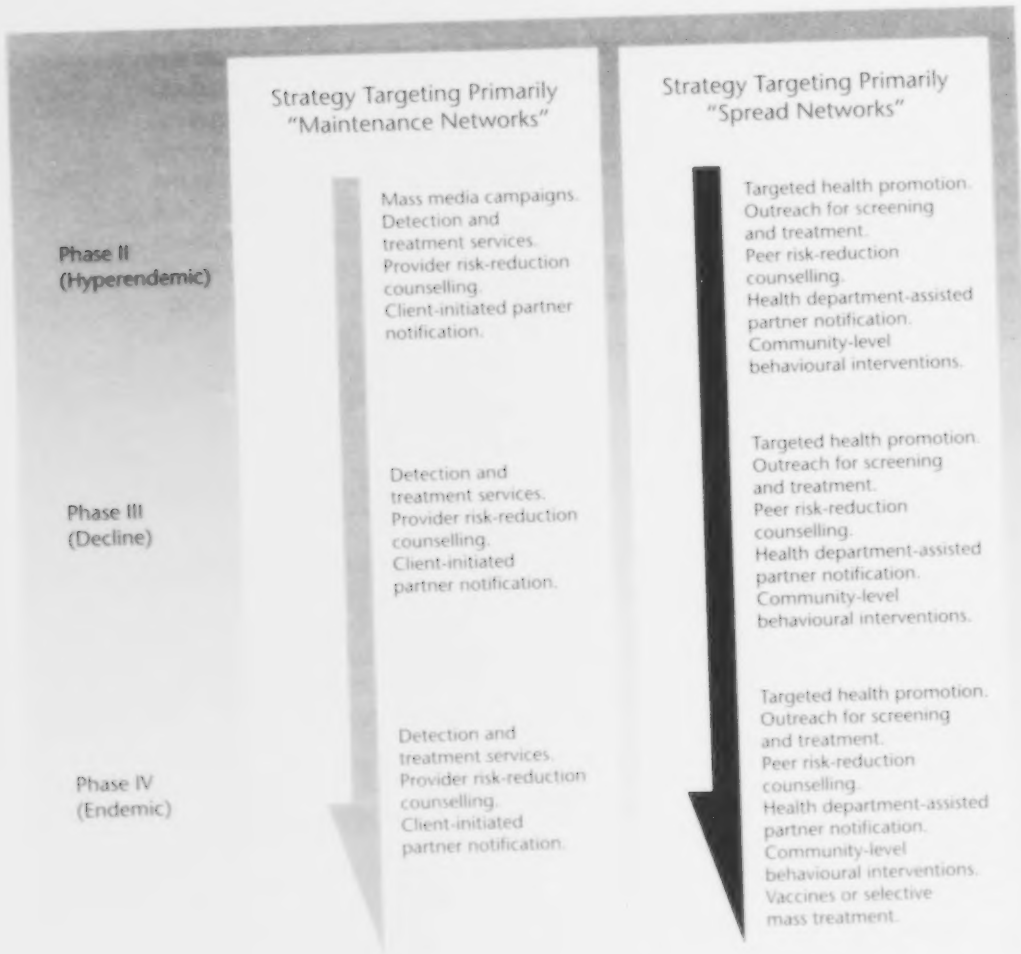
# 6 PREVENTION STRATEGIES AND DISEASE PHASE

Understanding the epidemiology of STDs is necessary for determining which prevention and intervention tools are appropriate in a given disease phase. The epidemiology of STDs changes as a function of STD control programs, and thus interventions should be tailored to the phase of the epidemic. The first phase in an STD epidemic is the 'growth' phase characterized by steadily increasing general population and core group rates of STDs (Wasserheit & Aral, 1996). The 'hyperendemic' phase is a plateau phase where the further spread of STDs is halted in much of the population through the introduction of control strategies. Control strategies during this phase will likely be broad, aimed at the general population. Strategies include diagnostic testing, treatment, and contact tracing (Wasserheit & Aral, 1996). However, as a result of control initiatives, the composition of core groups changes. Core group members become increasingly marginalized and thus harder to reach and at higher risk. Thus control strategies need to be examined for their effectiveness within certain groups.

During phase III, the 'decline' phase, incidence and/or prevalence will decline depending on the control strategies in place. Because of the marginalization of core group members which began during the hyperendemic phase, control strategies that aim to maintain a decline in all groups will need to be adaptive. Control strategies during the decline phase should be targeted at core or high-risk groups. Strategies here may include targeted screening, outreach and community interventions. The last phase, or the 'endemic' phase marks another plateau in which rates are consistently low in the general population, but higher rates are sustained in core groups. Control strategies during this phase will likely focus on sexual networks, and will include network analysis, outbreak investigation and peer outreach. Wasserheit and Aral (1996) have proposed a phase-appropriate STD prevention strategy that is population specific, differentiating between the general population (or maintenance networks) and core groups (or spread networks). This two-pronged phase-specific approach is reproduced in Figure 6.

FIGURE 6

**Two-Pronged Phase-Appropriate STD Prevention Strategies**




*(Wasserheit & Aral, 1996).*

# 7 CONCLUSION

A public health framework requires that prevention, intervention and treatment strategies be guided by scientific research. Data from thoughtfully designed multidisciplinary studies, developed in collaboration with community members, are necessary for developing and implementing culturally appropriate programs for community groups with high STD/HIV rates. For prevention programs at the primary, secondary and tertiary levels, this means that group-specific risk and protective factors must be identified and appropriately addressed. By developing and committing to provincial goals and using appropriate methods to address the needs of high-risk populations, a provincial STD strategy serves to:

- increase public awareness of STDs
- set STD control on the political agenda
- justify RHA expenditures specific to STD control
- monitor policy decisions in terms of their impact on provincial STD goals
- establish criteria by which to review and evaluate STD control programs

Once a strategy has been devised and implemented, evaluation is essential. Only through an evaluative process can the efficacy of a prevention program be assessed. Some of the basic issues that require assessment include:

- Have core groups been accessed by the control efforts?
- Has the composition and/or location of the core groups changed as a result of the intervention?
- Have the control efforts impacted on the phase of the epidemic?
- Is the intervention responsive to possible changes in the epidemic phase?
- How is the community responding to the control strategies?

Wasserheit and Aral (1996) have suggested that core groups are dynamic, and as such, are responsive to control efforts. The composition and/or location of an STD core group is likely to change as a result of intensified STD control efforts. Specifically, further marginalization of core group members may occur, thus making those at greatest risk for acquiring and spreading STDs the least likely to be accessed by Public Health. This is where surveillance and sexual network analysis become crucial to the success of an STD control strategy. Only through continued surveillance of the disease phase and group dynamics can core group members be identified and accessed. This requires centralized data surveillance and information dissemination regarding characteristics of high-risk groups to service providers and program planners.

What becomes apparent in devising a strategy is that numerous opportunities for intervention exist, both at the micro and the macro level. While STD prevention is one mandate of government public health agencies, it is not the sole domain of government. Numerous individuals, community groups and organizations exist which are in a position to impact greatly on the success of control efforts. Their contributions are valuable as multidisciplinary collaboration offers multiple entry points for STD prevention.

# 8 REFERENCES


Benenson, A. S. (Ed.). (1995). *Control of communicable diseases manual* (16th ed.). Washington, D.C.: American Public Health Association.

Berkow, R., & Fletcher, A. J. (Eds.). (1992). *The Merck manual of diagnosis and therapy* (16th ed.). Rahway, N.J.: Merck Research Laboratories.

Blanchard, J. F., Moses, S., Greenaway, C., Orr, P., Hammond, G. W., & Brunham, R. C. (1998). The evolving epidemiology of chlamydia and gonococcal infections in response to control programs in Winnipeg, Manitoba. *American Journal of Public Health, 88*, 1496-1502.

Brunham, R. C. (1997). Core group theory: A central concept in STD epidemiology. *Venereology, 10*, 34-39.

Cates, W., & Wasserheit, J. N. (1991). Genital chlamydial infections: Epidemiology and reproductive sequelae. *American Journal of Obstetrics and Gynecology, 164*, 1771-1781.

Cates, W., & Stone, K. (1992). Family planning, sexually transmitted diseases and contraceptive choice: A literature update – I. *Family Planning Perspective, 24*, 75-84.

Centres for Disease Control (Atlanta). (1993). Update: Barrier protection against HIV infection and other sexually transmitted diseases. *Morbidity and Mortality Weekly Report, 4*, 589-597.

Centres for Disease Control (Atlanta). (1996). Ten leading nationally notifiable infectious diseases – United States, 1995. *Morbidity and Mortality Weekly Report, 45*, 883-884.

Cohen, M. S., Hoffman, I. F., Royce, R. A., Kazembe, P., Dyer, J. R., Daly, C. C., Zimba, D., Vernazza, P. L., Maida, M., Fiscus, S. A., & Eron, J. J. Jr. (1997). Reduction of concentration of HIV-I in semen after treatment of urethritis: Implications for prevention of sexual transmission of HIV-I. *Lancet, 349*, 1868-1873.

Dickerson, M., Johnson, J., Delea, T., White, A., & Andrews, E. (1996). The casual role for genital ulcer disease as a risk factor for transmission of human immunodeficiency virus: An application of the Bradford Hill criteria. *Sexually Transmitted Diseases, 23*, 429-440.

Elliott, L., Blanchard, J. F., Dawood, M., Beaudoin, C. M., & Dinner, K. (1999). *The Winnipeg Injection Drug Epidemiology (W.I.D.E.) Study: A study of the epidemiology of injection drug use and HIV infection in Winnipeg, Manitoba.* (Available from the Epidemiology Unit, Public Health Branch, Manitoba Health, 4th floor - 300 Carlton Street, Winnipeg, Manitoba, CANADA, R3B 3M9).

Elliott, L., Blanchard, J. F., & Mestery, K. (1998). *Risk behaviour surveillance among Winnipeg STD clients.* (Available from the Epidemiology Unit, Public Health Branch, Manitoba Health, 4th Floor - 300 Carlton Street, Winnipeg, Manitoba, CANADA, R3B 3M9).

Goeree, R., & Gully, P. (1992). The burden of chlamydial and gonococcal infection in Canada. *Research Studies of the Royal Commission on New Reproductive Technologies and Prevention of Infertility, 8,* 29-76.

Health Canada. (1994). *Strategies for population health: Investing in the health of Canadians.* Federal, Provincial, and Territorial Advisory Committee on Population Health. Halifax, N.S.

Health Canada. (1996). *Canada disease supplement: Notifiable diseases annual summary, Vol. 2552* (Health Canada Publication No. 1188-4169). Ottawa, ON: Government Printing Office.

Health Canada. (1997). *Towards an impact statement: Setting national goals for sexually transmitted diseases and sexual risk behaviours.* Division of STD Prevention and Control, Bureau of HIV/AIDS and STD, Laboratory Centre for Disease Control. Draft discussion paper.

Health Canada. (1998a). Annual report of the Division of STD/HIV Prevention and Control: Sexually transmitted disease surveillance in Canada, 1995. *Canadian Communicable Diseases Report, 2451,* 1-32.

Health Canada. (1998b). [Enhanced STD Surveillance in Canadian Street Youth Protocol]. Available from the Communicable Disease Control Unit, Public Health Branch, Manitoba Health, 4th floor - 300 Carlton Street, Winnipeg, Manitoba, CANADA, R3B 3M9.

Health Canada. (1999). *Canada disease supplement: Notifiable diseases annual summary, Vol. 2556* (Health Canada Publication No. 1188-4169). Ottawa, ON: Government Printing Office.

Hook, E., Canon, R., Nahmias, A., Lee, F., Campbell, J., Glasser, D., & Quinn, T. (1992). Herpes simplex virus infection as a risk factor for human immunodeficiency virus infection in heterosexuals. *Journal of Infectious Diseases, 165,* 251-255.

Jemmott, J. B., Sweet Jemmott, L., Fong, G. T., & McCaffree, K. (1999). Reducing HIV risk associated sexual behaviour among African American adolescents: Testing the generality of intervention effects. *American Journal of Community Psychology, 27,* 161-187.

Kaufman, M. (1990). *Nutrition in public health: A handbook for developing programs and service.* Gaithersburg: Aspen Publishers.

Macdonald, N., Wells, G. A., Fisher, W. A., Warren. W. K., King, M. A., Doherty, J. A., & Bowie, W. R. (1990). High-risk STD/HIV behaviour among college students. *Journal of the American Medical Association, 263,* 3155-3159.

Manitoba Health. (2001). *Manitoba Health statistical update on HIV/AIDS, 1985-2000* (Available from the Communicable Diseases Control Unit, Public Health Branch, Manitoba Health, 4th Floor - 300 Carlton Street, Winnipeg, Manitoba, CANADA, R3B 3M9).

Manitoba Health. (1996). *Manitoba provincial AIDS strategy.* (Available from the Communicable Diseases Control Unit, Public Health Branch, Manitoba Health, 4th Floor – 300 Carlton Street, Winnipeg, Manitoba, CANADA, R3B 3M9).

Maticka-Tyndale, E. (1991). Sexual scripts and AIDS prevention: Variations in adherence to safer sex guidelines by heterosexual adolescents. *Journal of Sex Research, 28,* 45-66.

Maticka-Tyndale, E. (1997). Reducing the incidence of sexually transmitted disease through behavioural and social change. *Canadian Journal of Human Sexuality, 6,* 89-104.

Parent, R., & Alary, M. (1996). *Analyse des cas de gonorrhée, de chlamydiose, d'infection par le virus de l'hépatite B et de syphilis déclarés au Québec par année civile, 1991-1995.* Québec, QC: Gouvernement du Québec, Ministère de la Santé et des Services sociaux, Centre de coordination sur le sida.

Telzak, E., Chaisson, A., Bevier, P., Stoneburner, R., Castro, K., & Jaffe, H. (1993). HIV-I seroconversion in patients with and without genital ulcer disease. *Annals of Internal Medicine, 119,* 1181-1186.

Wasserheit, J. N. (1992). Epidemiological synergy: Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. *Sexually Transmitted Diseases, 19,* 61-77.

Wasserheit, J. N., & Aral, S. O. (1996). The dynamic typology of sexually transmitted disease epidemics: Implications for prevention strategies. *The Journal of Infectious Diseases, 174(Suppl 2),* S201-S213.

# 9 APPENDIX A – PROPOSED PROVINCIAL GOALS

**Chlamydial infection**

- Reduce the overall annual incidence of chlamydial infection to 95 cases per 100,000 population by the year 2010.
- Reduce the annual incidence of chlamydial infection for 15-24 year old women to 419.5 cases per 100,000 population by the year 2010.

**Gonorrhea**

- Eliminate locally transmitted cases of gonorrhea by the year 2010.

**Pelvic Inflammatory Disease**

- Reduce the annual incidence of PID requiring hospitalization to 47 cases per 100,000 population by the year 2010.

**Ectopic Pregnancy**

- Reduce the annual rate of ectopic pregnancy to 6 per 100,000 pregnancies by the year 2010.

**Infectious Syphilis**

- Eliminate locally transmitted cases of infectious syphilis by the year 2005.
- Maintain the annual incidence of infectious syphilis at less than 0.5 per 100,000 population.

**Acute Viral Hepatitis B**

- Establish universal hepatitis B immunization by the year 2002.
- Reduce the incidence of acute viral hepatitis B infection by 50% by the year 2010.

**Condom Use**

- Develop a framework for conducting surveillance among adolescents and other high-risk populations.

**Screening and Testing**

- Increase screening rates for chlamydial infection among sexually active 15-24 year old females and males to 50% and 25% respectively by the year 2005.
- Increase screening rates for chlamydial infection among sexually active 15-24 year old females and males to 75% and 50% respectively by the year 2010.
- Make nucleic acid amplified urine-based testing available to all sexually active 15-24 year olds and other high-risk individuals by the year 2001.

# 10 APPENDIX B – TOOLBOX OF INTERVENTIONS FOR STD CONTROL

- "Passive" case identification and treatment
- Active contact identification and treatment
- Generalized population-based STD screening
- Selected (targeted) STD screening
- General health education (mass media, IEC, etc.)
- Targeted education to high risk groups
- Individual and group behavioural interventions
- Peer educator-mediated community mobilization
- Active case finding through sexual network analysis
- School-based educational services
- Outbreak investigation to disrupt transmission networks
- Harm reduction: needle exchange, safe venues for commercial sex, addictions treatment services, drug substitution, etc.
- Community-based outreach
- Selective mass treatment